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TOBACCO ETCH VIRUS

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Tobacco etch virus (TEV) was originally reported in Kentucky in 1928 by Valleau and Johnson (10). TEV is presently found in North and South America (7), and is common in Florida. TEV is a member of the Potyvirus group, primarily aphid transmitted in a stylet-borne, nonpersistent manner. It causes disease and yield loss to several solanaceous crops, including Capsicum annuum L. (sweet pepper), Capsicum frutescens L. (tabasco pepper), Nicotiana tabacum L. (tobacco), and Lycopersicon esculentum (tomato). Overall, more than 100 species in 19 dicotyledonous families were found to be experimentally susceptible (4,7).

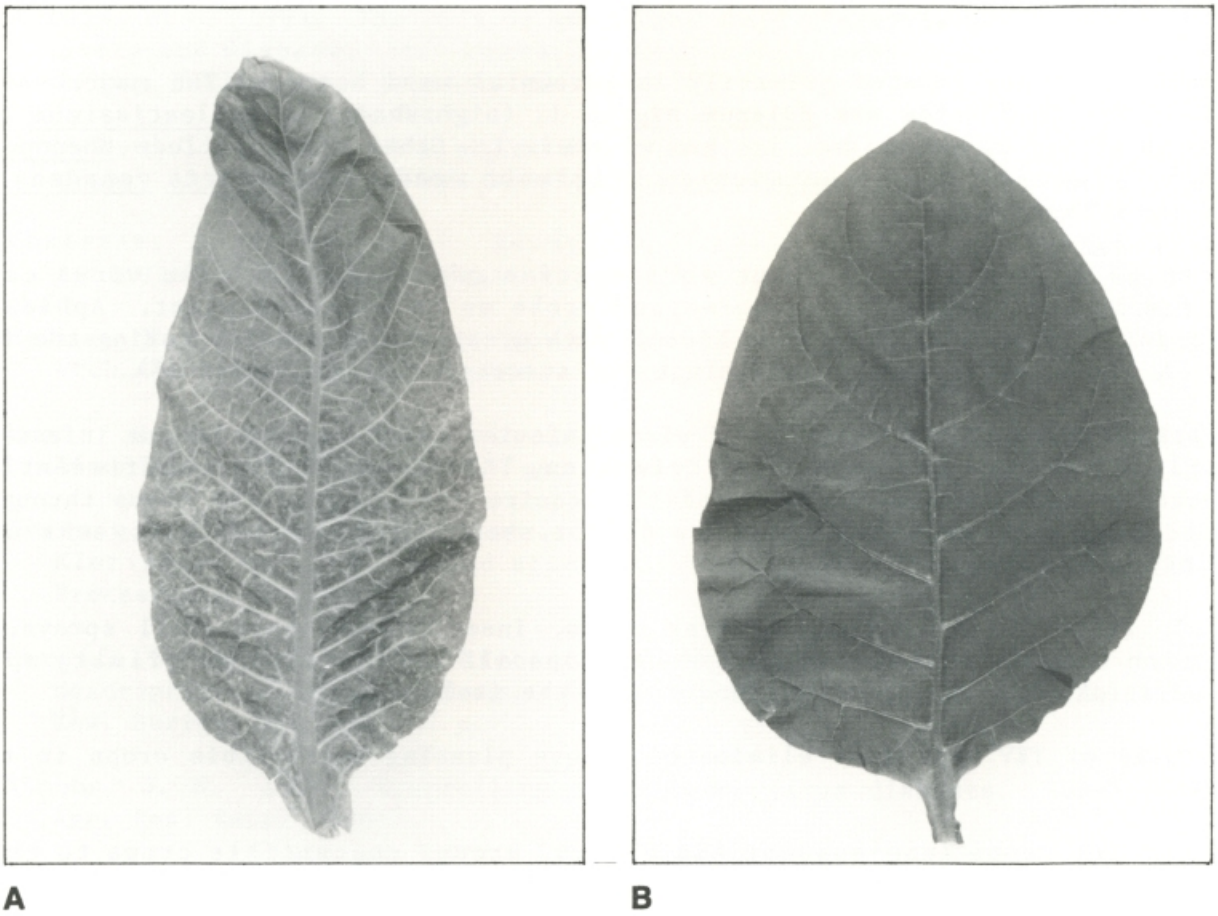

Fig. 1. Tobacco leaves. A) Vein clearing and mottling of tobacco leaf infected with TEV. B) Healthy tobacco leaf. (DPI Photos by Jeffery Lotz.)

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Symptoms. Initial symptoms of TEV appear as vein clearing on young expanding tobacco leaves, 7 to 14 days after inoculation. Leaf mottle, chlorosis and/or etching are other symptoms associated with this viral infection. Etching appears as gray or necrotic lines, circles or flecks. Considerable symptom variation occurs due to the strain of infecting virus, growing conditions, plant vigor, and host variety.

Field symptoms on tobacco with TEV infection are often noticed at the approach of the flower bud stage. They consist of vein clearing, mottle, and necrotic lines. Symptoms intensify after topping (5,9).

Symptoms on pepper and tomato include mottle and distortion of leaves and fruit. Plants become stunted. Tomato yields may be reduced by 25% or more (7).

Disease Development. Most viruses require living host tissue in which to survive and multiply. Generally, viruses are restricted to a specific host, although some are capable of infecting a wide host range composed of many plant families and their members (6).

TEV reservoirs are located primarily in perennial weed hosts. The major natural hosts of TEV in Florida are Solanum nigrum L. (nightshade) S. aculeatissimum Jacq. (soda-apple) and Physalis spp. L. (ground cherry). Other hosts include Chenopodium album L. (pigweed), Datura stramonium L. (jimson weed), and Linaria canadensis L. (blue toadflax) (1,2).

TEV can be transmitted by 10 or more species of aphids (7). The virus can be acquired by the aphid with a ten-second probe on an infected plant. Aphids can retain infectivity for up to four hours, with greatest infectivity during the first hour. A ten-second probe is sufficient for successful transmission (7).

Susceptible crops in the vicinity of virus infected weeds tend to become infected at an early stage (1). One week after infection, TEV has multiplied sufficiently in the host to *enable* aphids to successfully acquire and transmit the virus throughout a field planting, although symptoms do not show until two to four weeks after infection (8).

Control. Proper weed control, barrier crops, insecticides, stylet-oil sprays, and isolation from established solanaceous crops all help to *prevent* primary spread (transmission of virus from weed hosts into the field planting).

Weed hosts of TEV should be eliminated before planting susceptible crops in their vicinity.

Crow barrier crops (non-susceptible plants) around susceptible crops to reduce chances of viruliferous aphids entering the field (8).

Insecticides may be helpful, *however,* aphids acquire and transmit viruses so quickly that residual aphicides have little or no *effect* on controlling disease spread.

There have been reports of weekly oil sprays reducing the rate of virus spread in peppers. Properly applied, a thin layer of oil seems to interfere with the aphids acquisition and/or transmission of the virus thereby extending harvest periods (12).

Once the virus enters the field, secondary spread (within field) can be rapid. Approximately 95% of overall spread is secondary. No insecticides or rogueing of diseased plants seem to alleviate the problem.

Survey and Detection. Susceptible crops include pepper, tobacco, tomato, and various other solanaceous crops. Look for vein clearing, leaf mottle, chlorosis and etching. Laboratory diagnosis is needed for positive identification. Tobacco etch induces a diagnostic nuclear inclusion in addition to the cytoplasmic cylindrical inclusions unique to the Potyvirus group (3).

When collecting plant material, pull an entire plant when possible, one that can be propagated in a greenhouse. Keep the plant cool and minimize moisture loss. Fresh plant material is best for laboratory diagnoses.

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